

**IN THE DRAWINGS**

The attached sheet of drawings includes changes to Fig. 4. This sheet, which includes Fig. 4, replaces the original sheet including Fig. 4.

Attachment: Replacement Sheet (1)

### **REMARKS/ARGUMENTS**

Favorable reconsideration of this application is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 1-8 are pending in the application, Claims 1 and 4 having been amended and Claim 8 having been added by the present amendment.

In the outstanding Office Action, Claims 1-7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Beatty et al. (U.S. Patent 6,692,249).

The specification and drawings have been amended for formality. In particular, the specification has been amended to insert headings, and Figure 4 of the drawings has been amended to remove Reference Numerals 72a, 72b and 72c and add the legend "Background Art."

Claims 1 and 4 have been amended and Claim 8 has been newly added herein. These amendments and addition in the claims are believed to find support in the specification, claims and drawings as originally filed, for example, the specification, page 4, line 18, to page 5, line 6, as well as Figure 2. Hence, no new matter is believed to be added thereby. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive mutually satisfactory claim language.

Before addressing the outstanding Office Action, Claim 1 as currently amended according to the present invention is believed to be helpful. Amended Claim 1 is directed to an outer tube which has a body made of silicon carbide, configured to be used in a thermal treatment system and having an upper portion, a lower portion and a flange. The upper portion is closed, the lower portion is open and is formed with a tapered portion expanding toward a lower end of the body, the flange is formed on an outer peripheral side of the lower portion, and the following conditions are met: 1) a ratio of  $t_a/D_1$  is from 0.0067 to 0.025, 2) a

product of  $t_a \times D_1$  is from 600 to 4,000 ( $\text{mm}^2$ ), 3)  $(D_{F2} - D_{F1}) \times t_c / (D_1 \times t_a)$  is from 0.1 to 0.7, and 4)  $L_1/L_2$  is from 1 to 10, where the lower portion has a thickness of  $t_a$  (mm) and an inner diameter of  $D_1$  (mm), the flange has a thickness of  $t_c$  (mm), an inner diameter of  $D_{F1}$  (mm) and an outer diameter of  $D_{F2}$  (mm), and the tapered portion tapers such that the lower portion is expanded from the inner diameter  $D_1$  to the inner diameter  $D_{F1}$  over a height  $L_1$  (mm) and an expanse of  $L_2$  (mm). By providing such a lower portion, the outer tube according to Claim 1 allows a larger size in its diameter and exhibits better durability and improved isothermal heating zone.<sup>1</sup>

Beatty et al. is directed to a hot liner insertion/removal fixture. However, it is respectfully submitted that Beatty et al. neither teaches nor suggests “a body made of silicon carbide ... and having ... a lower portion and a flange, wherein ... the lower portion is open and is formed with a tapered portion expanding toward a lower end of the body, the flange is formed on an outer peripheral side of the lower portion ...; where the lower portion has a thickness of  $t_a$  (mm) and an inner diameter of  $D_1$  (mm), the flange has a thickness of  $t_c$  (mm), an inner diameter of  $D_{F1}$  (mm) and an outer diameter of  $D_{F2}$  (mm), and the tapered portion tapers such that the lower portion is expanded from the inner diameter  $D_1$  to the inner diameter  $D_{F1}$  over a height  $L_1$  (mm) and an expanse of  $L_2$  (mm)” as recited in amended Claim 1. That is, the lower portion which includes the tapered portion has a thickness  $t_a$ , the tapered portion is expanding the inner diameter, and the flange is formed on an outer peripheral side of the lower portion. Thus, the tapered portion of the lower portion forms an angle of less than  $90^\circ$  in the inside with respect to the surface of the base and an angle of more than  $90^\circ$  on the outside (see Appendix A). On the other hand, the tube shown in Beatty et al. has a “tapered” portion which has a different thickness from the rest of the tube, i.e., the “tapered”

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<sup>1</sup> See, for example, Specification, page 4, lines 12-17.

portion of Beatty et al. is made thicker than the rest of the tube. As such, it is believed that excessive stress is exerted on the thicker portion of the Beatty et al. tube, making it less durable. Furthermore, the tube shown in Beatty et al. has the flange and “tapered” portion supporting the tube at the right angle, and thus more stress is believed to be concentrated toward the flange as shown in Figure 4, making it more likely to be broken. Therefore, it is respectfully submitted that the structure recited in amended Claim 1 is believed to be distinguishable from Beatty et al.

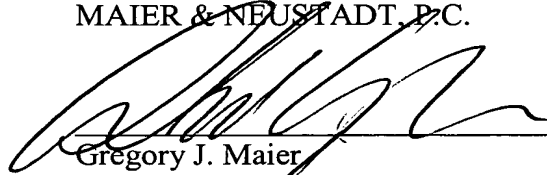
Likewise, Claims 4 and 8 are believed to include subject matter substantially similar to what is recited in amended Claim 1 to the extent discussed above. Thus, Claims 4 and 8 are also distinguishable from Beatty et al.

For the foregoing reasons, Claims 1, 4 and 8 are believed to be allowable. Furthermore, since Claims 2, 3 and 5-7 ultimately depend from either Claim 1 or 4, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 2, 3, and 5-7 are believed to be allowable as well.

In view of the amendments and discussions presented above, Applicants respectfully submit that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Gregory J. Maier  
Attorney of Record  
Registration No. 25,599

Customer Number

**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 06/04)

Akihiro Yamazaki  
Registration No. 46,155

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# APPENDIX A



Figs. 1-3

Beatty et al. USP 6,692,249

